

INSTALLATION TRANSFORMATION CONTINUUM



2003

2015

...and
beyond

BRAC
2005

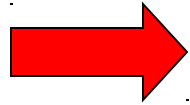
Future
Realignments

***FORT FUTURE Tools: Sustainable Installation
Modeling***

STO # IV.EN.2002.02

Dr. Michael Case - Special Project Officer

Outline



- Introduction
- Requirements
- Scope Overview
- System Design
- Facility Composer
- Prototypes
- Schedule

What is Fort Future?

Fort Future is a decision support and planning framework that helps users to evaluate and compare proposed planning alternatives using modeling and simulation

*Environmental Quality and
Installations*

Fort Future is:

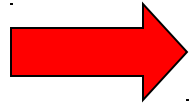
- Web-based
- Collaborative
- A Sustainable Installation Planning Tool
- Extensible (plug-ins)

*Environmental Quality and
Installations*

Product

- Inputs
 - Human judgment
 - GIS
 - STAMIS (IFS, ISR, RPLANS, etc)
- Outputs
 - Analysis Documents
 - Visualizations
 - Planning documents

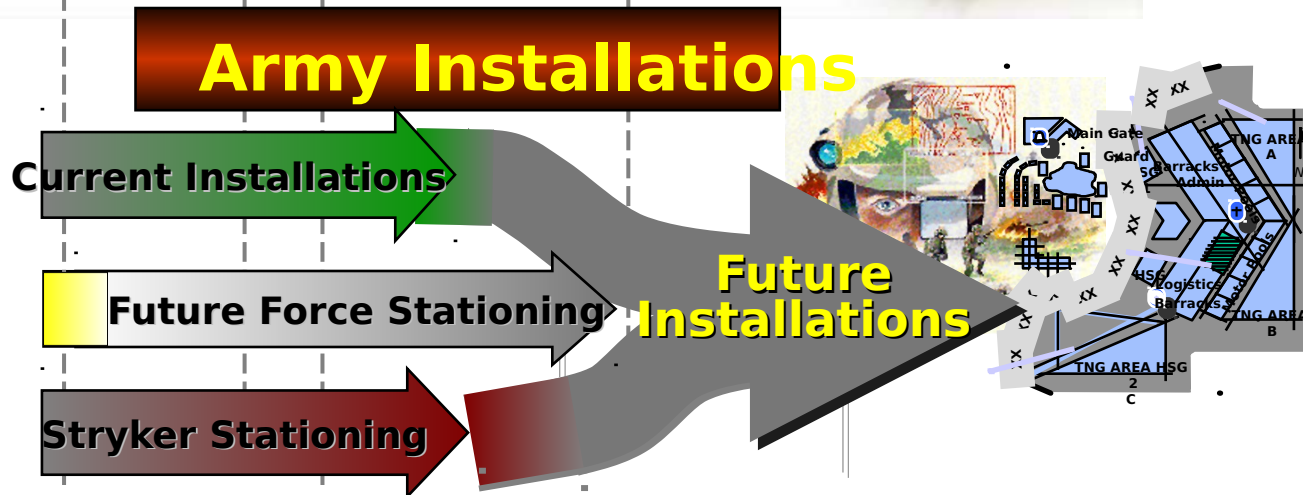
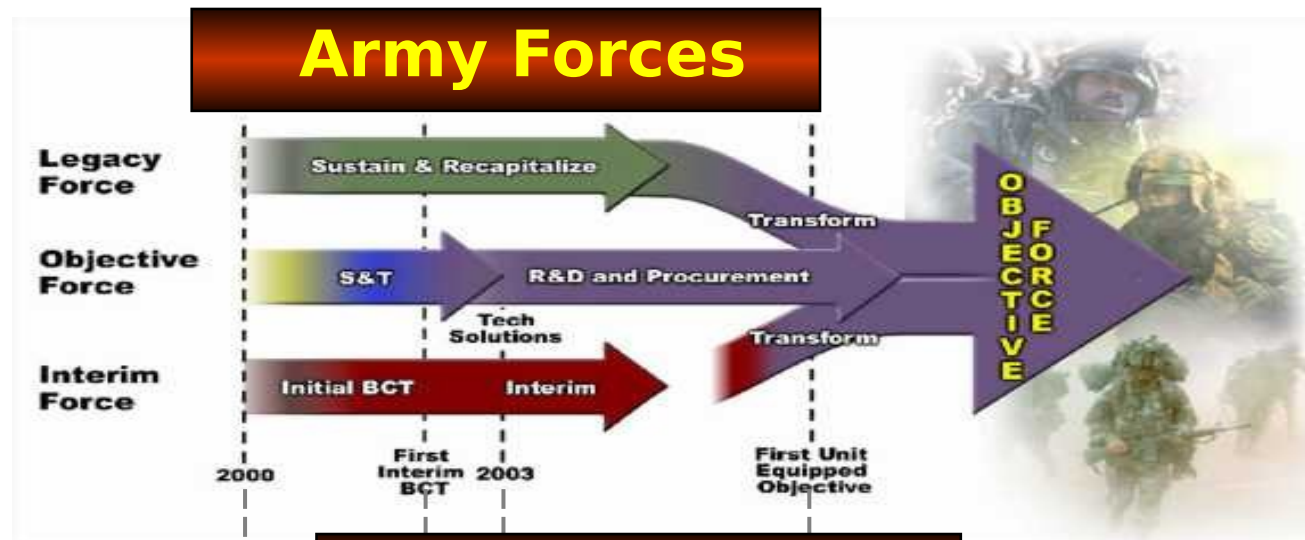
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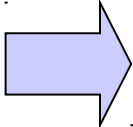
Transformation Campaign Plan: LO12

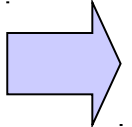
Environmental Quality and
Installations



New Complex Installation Requirements...



- 
- Equipping
 - Stationing
 - Fielding

- 
- Power Projection Platforms upgraded transportation systems
 - Combat Preparation and Sustainment Bases sustainable training
 - Secure Sanctuaries passive and active systems
 - Information Hubs new infrastructure
 - Holistic Communities modern, pleasant installations, linkage to community

... demand complex analysis capability



TOFFLER ASSOCIATE
S[®]



Installation Transformation Wargame FY03

~~Executive Summary of Final Report~~

Bob Bivins, Tom Johnson, Steven Kenney, Richard Szafranski, Rocky Wilkinson

~~August 26, 2003~~

302 Harbor's Point . 40 Beach Street . Manchester, Massachusetts
01944

978-526-2444 . Facsimile: 978-526-2445 . Email:
tofflerassociates@toffler.com

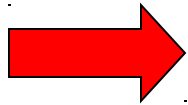
Capabilities Needed

Results from 2 ACSIM/USACE Installation Planning Wargames validate requirements for:

- Better way to link mission requirements, equipment, and infrastructure
- “Meta-planning” capability – I.e., better planning
- Ability to assess power projection capability, risk, and cost.
- Adaptable, agile, responsive planning & construction
- Better way to integrate Force Protection considerations in planning decisions
- Assured viability of Training Assets over time

Balancing total Army needs and meeting Transformation pace requires means of exploring possible solutions before committing limited resources

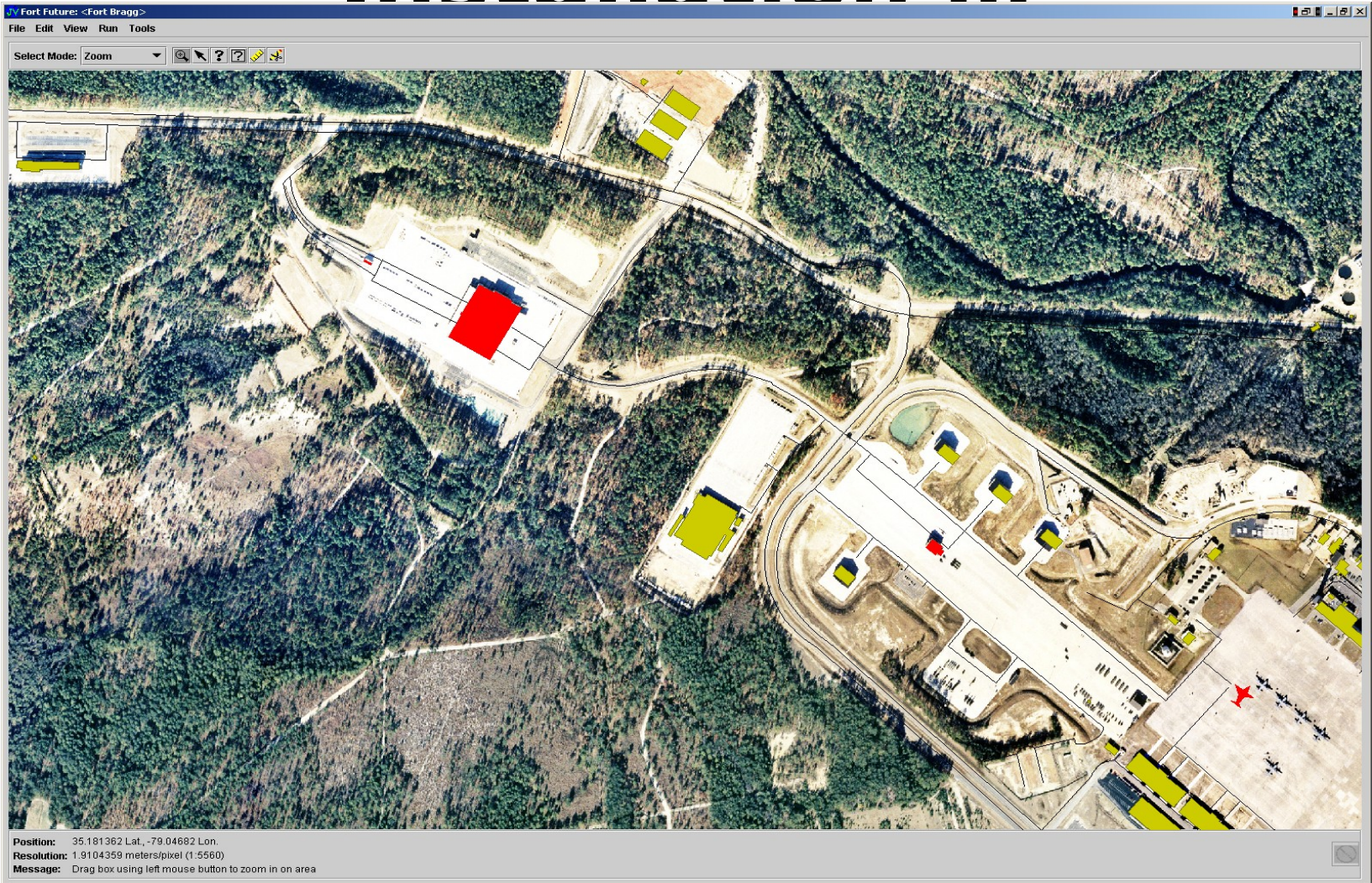
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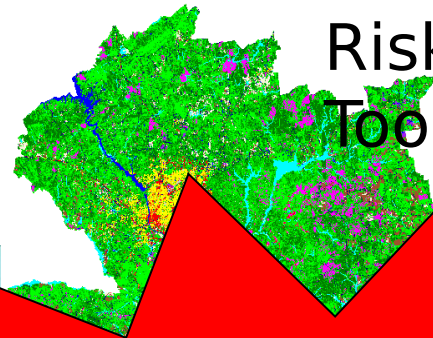
Imagine a Virtual Installation ...

Environmental Quality and Installations

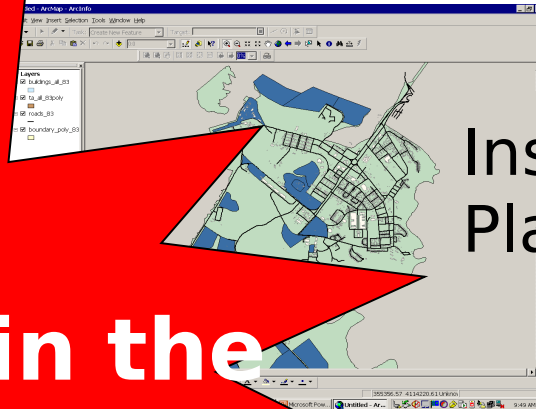


Fort Future Tools for Complex, Integrated Analysis

Power Projection
Planner

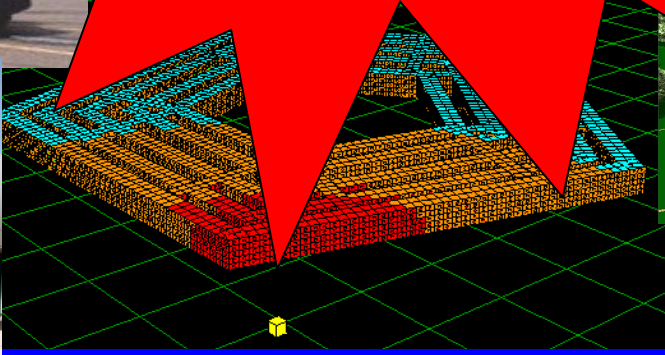


Risk and Encroachment
Tools

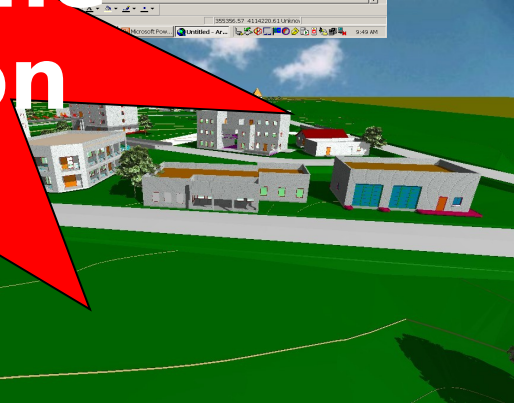


Installation
Planner

**What if?
Study options in the
Virtual Installation**



Force Protection Tools



Facility Composer

Integrated Installation

- Planning tool is the **Plan** integrator

- METL tool captures mission requirements

- Stakeholders participate in creating Courses of Action



- Run analyses across functional areas

- Visualize outcomes

- Responsive Master

Requirement: Balance multiple mission needs for the long-term
Plan generation

Power Projection Planner

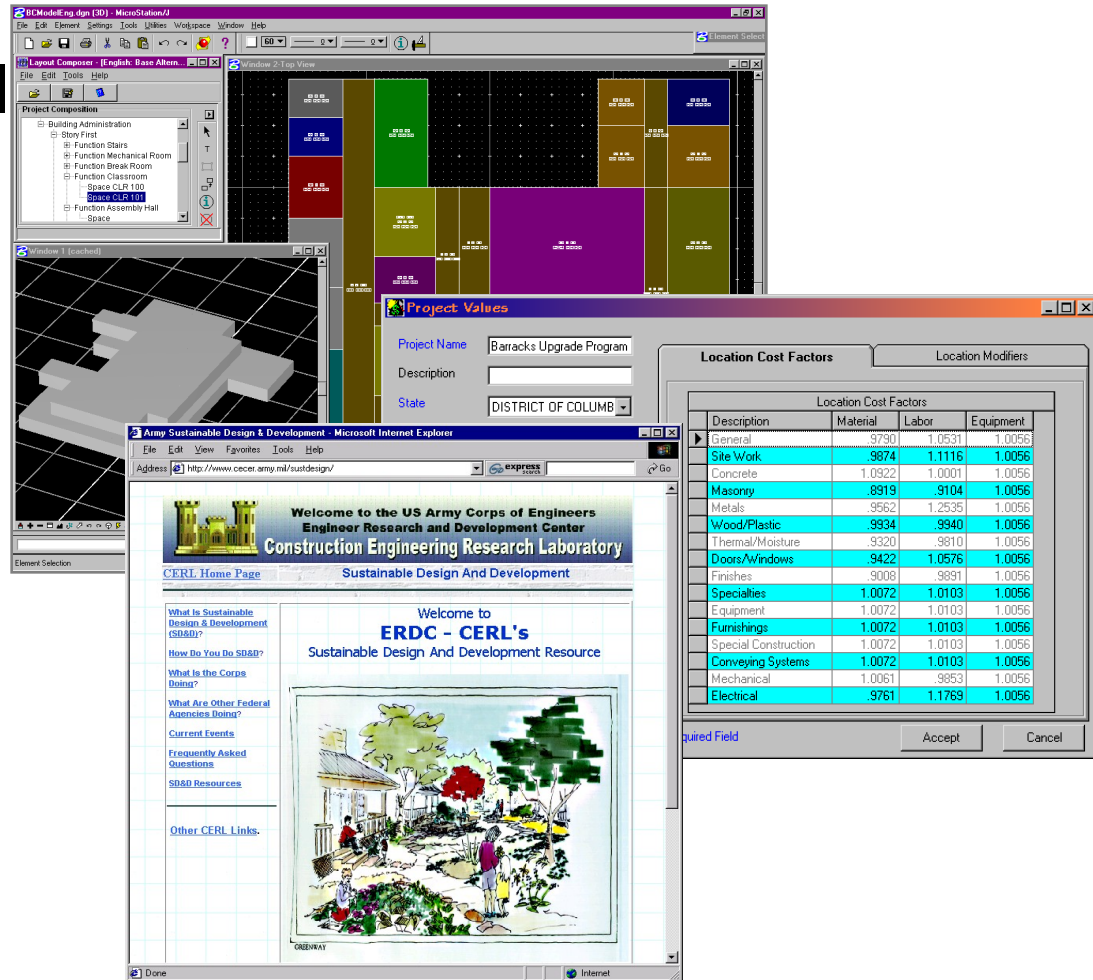
- Model Deployment Processes
- Assess ability of infrastructure to support deployment
- Explore infrastructure option
 - Time
 - Cost
 - Risk
- Single or multiple installations



Requirement: Risk-based approach to investment

Facility Composer

- Capture and apply Unit Set Fielding criteria and requirements
- Rapidly estimate design and cost
- Design sustainable Facilities
- Incorporate Lessons-learned



Requirement: Assure facilities ready for OF fielding

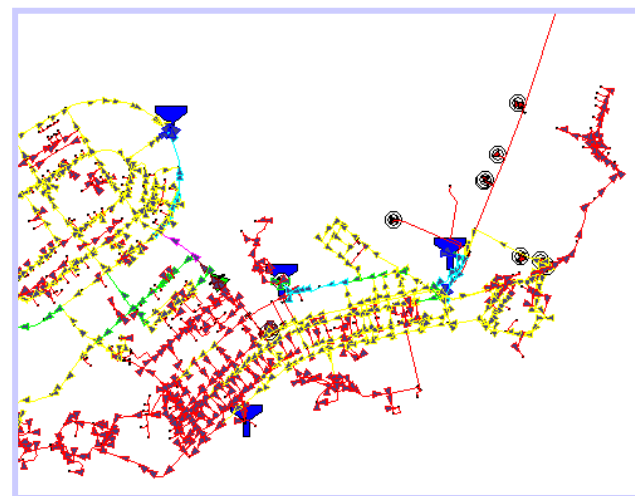
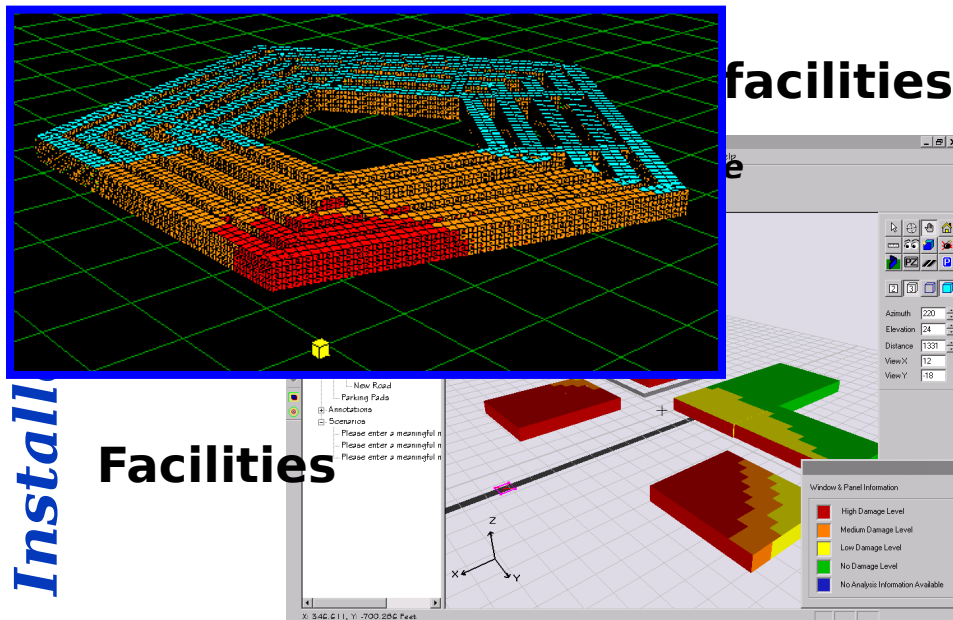
"One ERDC....Providing Technologies for the Transformed Army"

Force Protection Tools

- Determine infrastructure vulnerability to blast or CBR attack
- Assess impact of attack on human life and mission



Airborne CBR attack



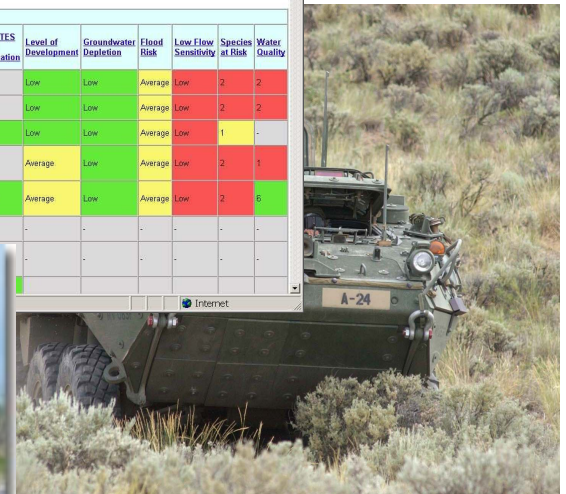
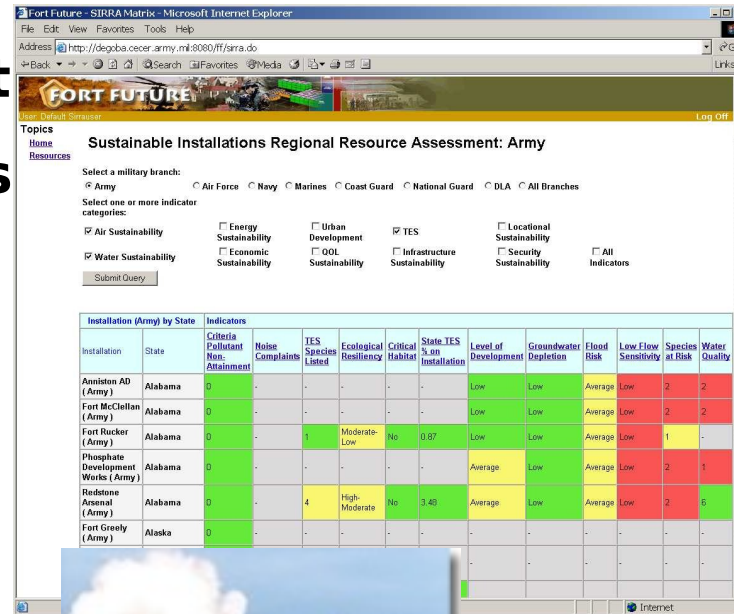
Water system CBR attack

Requirement: Meet new security threats

"One ERDC....Providing Technologies for the Transformed Army"

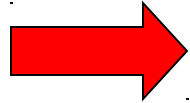
Risk & Encroachment Tools

- National Risk Assessment
- Analyze encroachment risks
 - Frequency
 - Noise
 - Dust, smokes, & obscurants
 - Endangered species
- Detect impact on historic and cultural resources



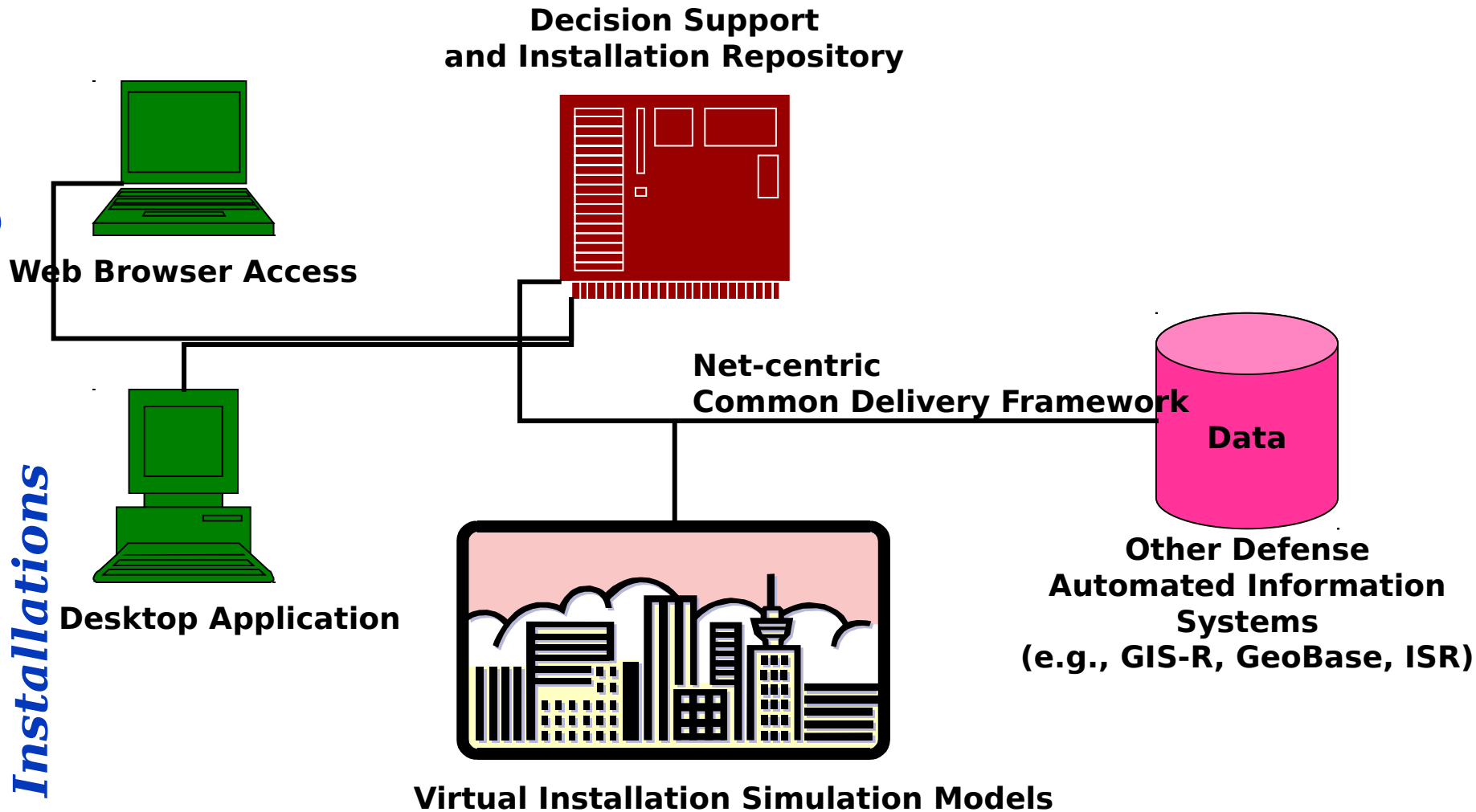
Requirement: Maximize Training Opportunities

Outline

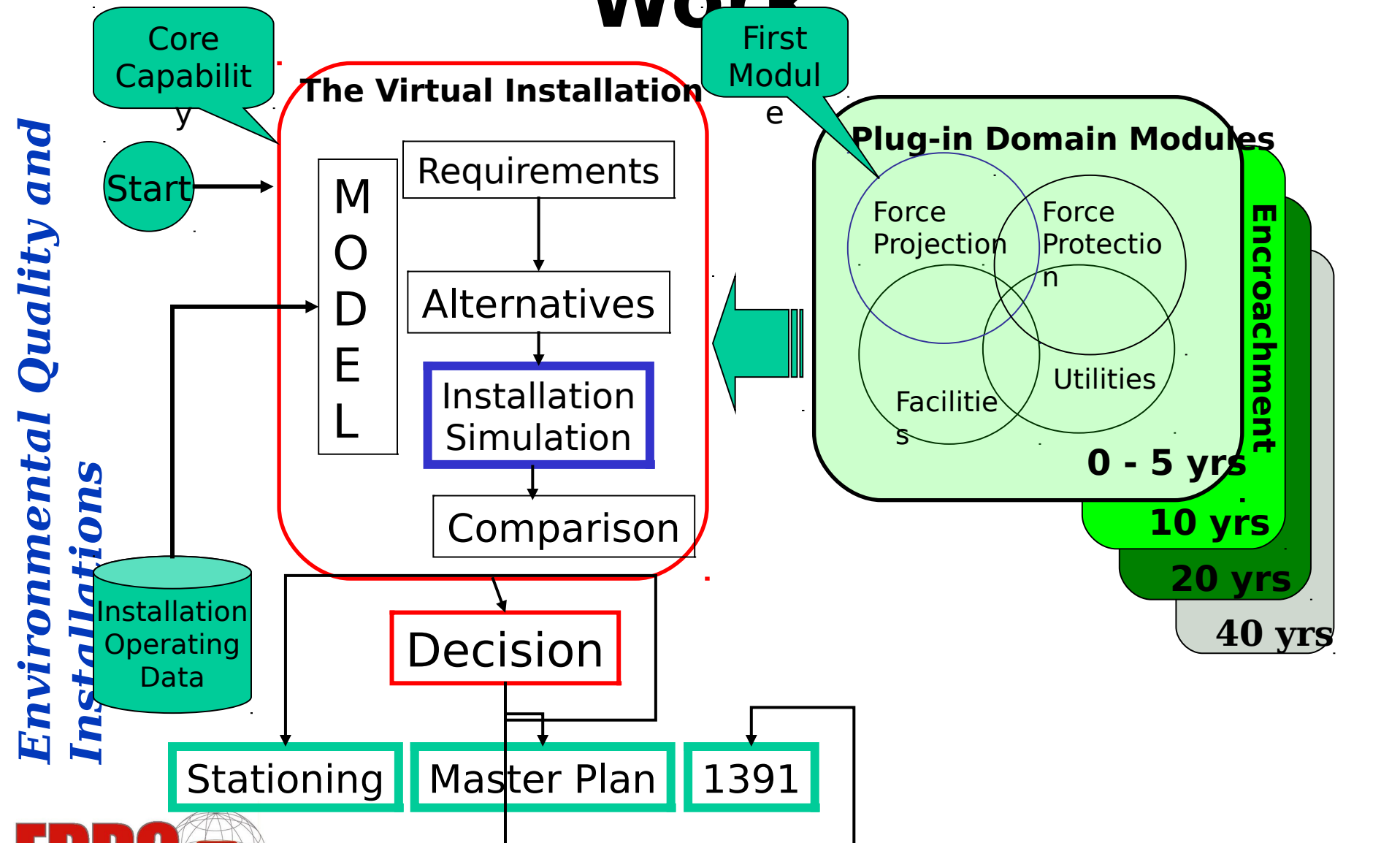


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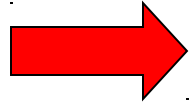
Components



How Fort Future Tools Will Work



Outline



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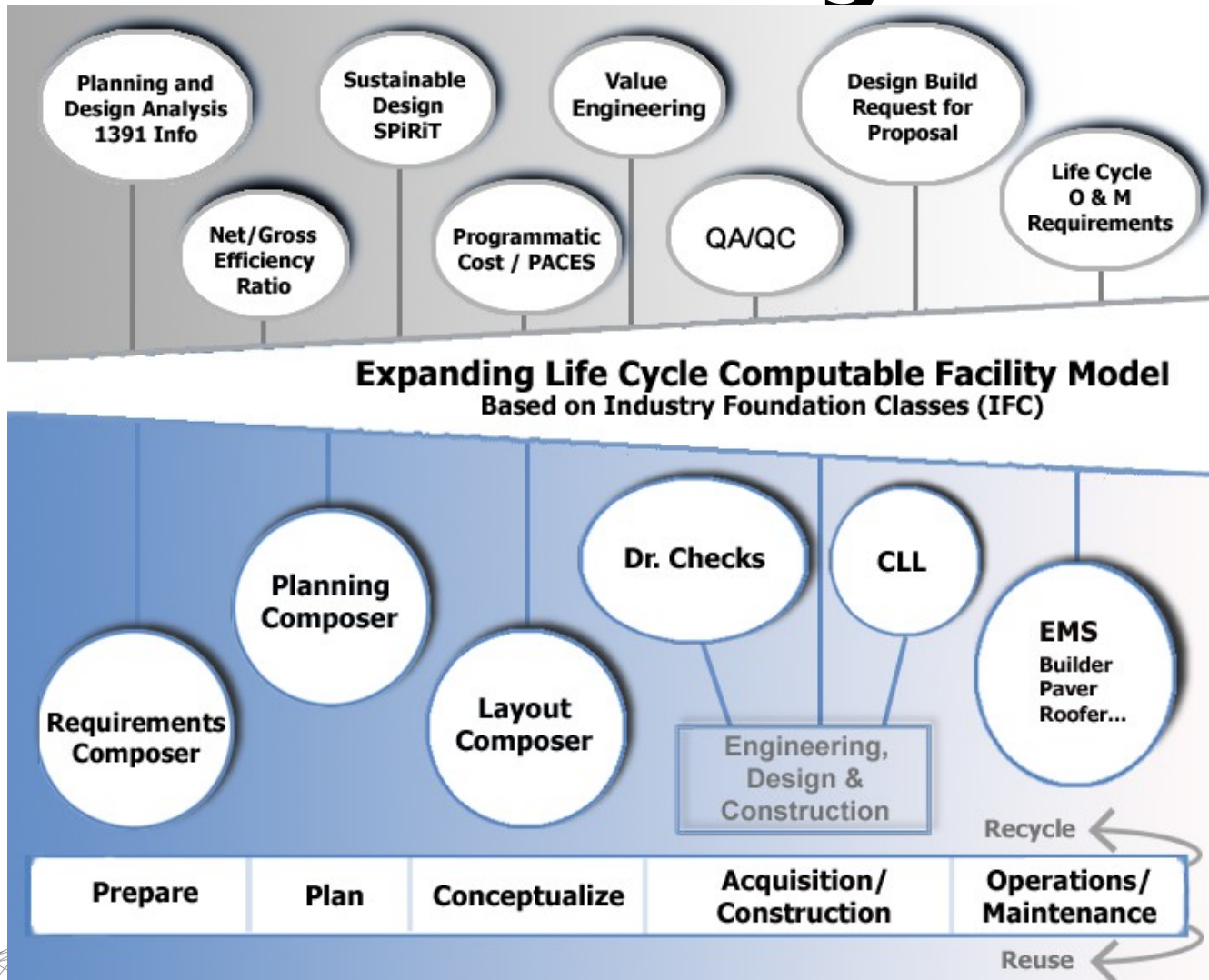
Facility Planning Tools

Environmental Quality and
Installations



Facility Composer

Life-Cycle Facility Modeling



Environmental Quality and Installations

Why Facility Composer?

- Capture requirements that are governmental in nature
- Rapidly generate facility requirements and programmatic cost estimate
- Easier to work with contractors
- Better interoperability with technology vendors

What is Facility Composer?

Criteria/Requirements-Based Design

- Create standard requirements and criteria repository
- Generate architectural program and preliminary design based on customer-specific requirements and criteria

Jump start standards-based computable data model

Create 2-D/3-D space layout with associated criteria

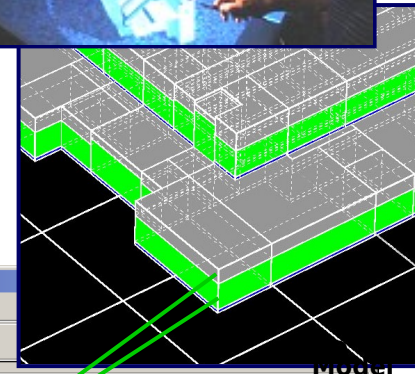
Integrate with COTS/GOTS CAD and analysis tools through modeling standards

Modeling Standards (IAI) Industry Foundation Class (IFC)

```

IfcBuilding
+ GlobalId
+ OwnerHistory
  Owner history [all]
+ Contains
  Containment [all]
    RelatedObjects
      Building storey [all]
+ IsContainedBy
  Containment [all]
    RelatingObject
      Site [all]
+ LocalPlacement
  Relative placement [all]
    PlacementRelTo
  
```

Advanced Visualization for making OF facility design decisions



Criteria Composer: English: Base Alternative: SED.prj

File Edit View Building Story Function Help

Project Composition

- Project SED
 - Site
 - Building Administration
 - Story Second
 - Function Class/Break
 - Function Classroom
 - Function Computer Room
 - Function Conference
 - Function Corridor
 - Story First
 - Function Assembly Hall
 - Function Break Room
 - Function Class/Break
 - Function Classroom
 - Function Computer Room
 - Function Conference
 - Function Corridor

Design Criteria

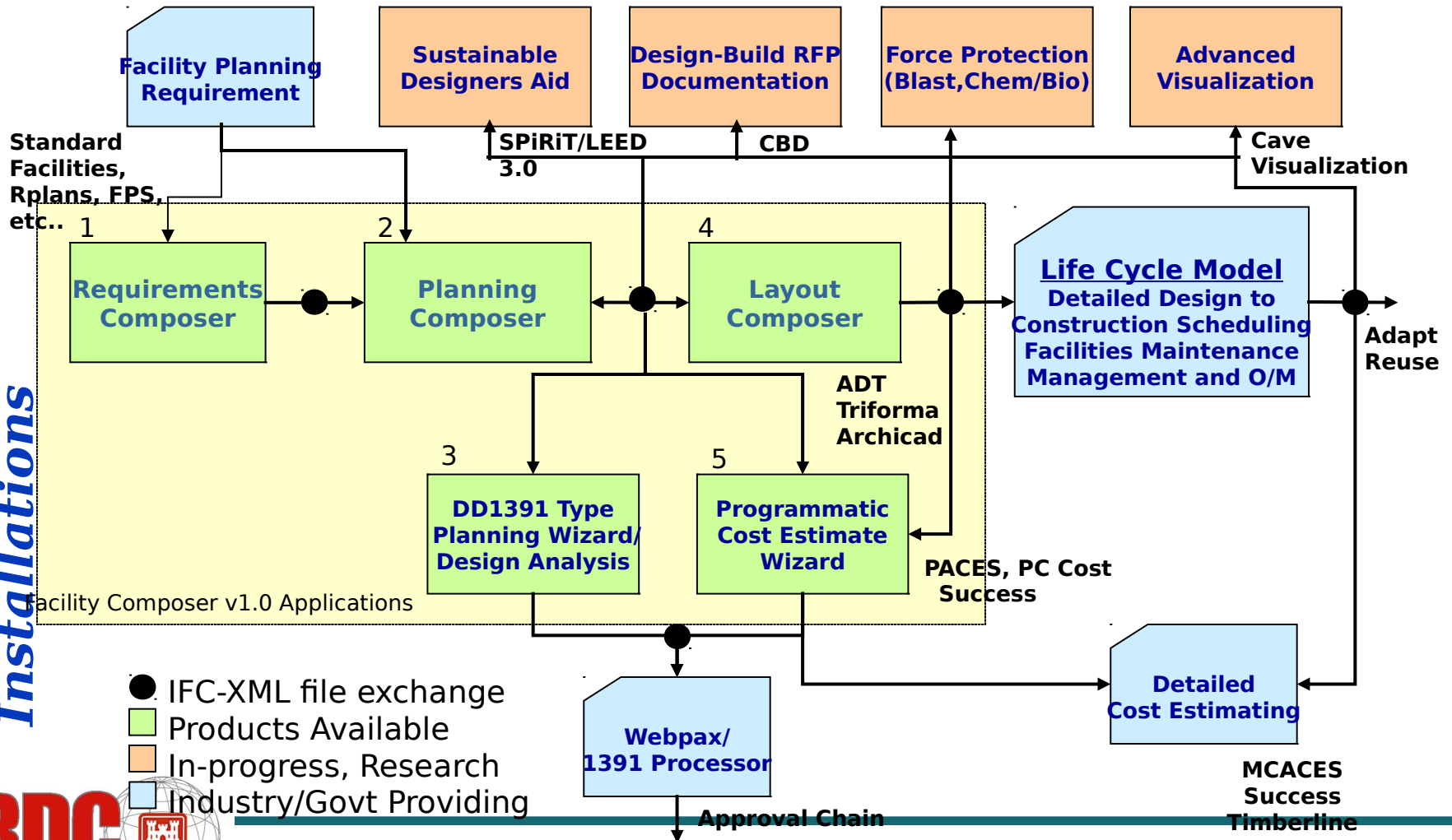
Requirement	Value	UOM	Source
FloorToCeilingHeight	13.33	NONE	
FloorToFloorHeight	16.67	ft	
Code			
Max. floor area per occupant	4.0	SF	Table 1003.2.2 IBC
Occupancy Classification	A-1		Chpt 3 of IBC
Occupancy Load	150	Number	

Add User Criteria... Add Library Criteria... Delete Criteria

Facility Modeling Process

for Planning Charrettes to Design-Build Documentation

Environmental Quality and Installations



"One ERDC....Providing Technologies for the Transformed Army

Requirements Composer

- Environmental Quality and Installations**
- Centralized repository
 - Links requirements to project, building, story, function, or space type
 - Outputs XML library for use in developing facility program
 - Provides permission based access controls

BCCM: Criteria list - Microsoft Internet Explorer

Address: https://bc.cecer.army.mil/bc/cm/criteria.jsp?id=104

Facility Composer Requirements Composer

home | requirements composer | planning composer | layout composer | wizards | support | logout system

home > Library List > Battle Simulation Facility

Beth Brucker

[Create Criterion] [Categories] [Disciplines] [Functions]

Criteria Name	Category	Discipline	Last Mod.	Updated By
Accessible Parking	Required Parking	Civil	04/03/03	Matt Geaman
Area Cover - Grass	Grass Area	Landscaping	04/03/03	Matt Geaman
Area Cover - Woodland	Woodland Area	Landscaping	04/03/03	Matt Geaman

FCRC: Libraries - Microsoft Internet Explorer

Address: https://bc.cecer.army.mil/bc/cm/libraries.jsp

Facility Composer Requirements Composer

home | requirements composer | planning composer | layout composer | wizards | support | logout system

home > Library List

Beth Brucker

Create Library

Library Name	Library Type	Organization	POC
Barracks Facility	Barracks	CERL	Matt Geaman
Battle Simulation Facility	Battle Sim	CERL	Matt Geaman
CACTF Facility	CACTF	CERL	Matt Geaman
Component Library Test	Army Reserve - Layout	CERL	Susan Pres
Dave McKay x3495	USN Admin Bldg (CC 610-10)	CERL	Dave McKay
Digital Multiourose Rance	Rance Facility	CERL	Matt Geaman

Planning Composer

- Create facility program with associated project criteria and requirements
- Creates IFC model from chosen requirements
- Repository/starting place for GOTS and COTS analysis tools

Building Program (Square Feet):

Name	Project	Available	Allocated	Building	Available	Allocated
AAR Facility	8800.0	0.0	8800.0	8800.0	8800.0	0.0
Administration	300.0	0.0	300.0	300.0	300.0	0.0
BCTP Corps Office	250.0	0.0	250.0	250.0	250.0	0.0

Planning Composer: English: Base Alternative: stow report.prj

File Edit View Building Story Function Help

Project Composition

- Project Synthetic Theater of War
 - Site Fort Readiness
 - Building STOW
 - Story One
 - Function Chief Office
 - Function Closet
 - Function Communications Room
 - Function Digital Battle Staff Trainer
 - Function Director Assistant
 - Story Two
 - Function Brigade/Battalion Simulation
 - Function Communications Room
 - Function Exercise Director Office
 - Function Group Manager Office
 - Function Janitor's Closet
 - Function Janitor's Office
 - Function AAR Facility
 - Function Administration
 - Function BCTP Corps Office
 - Function Break Room
 - Function Brigade/Battalion Simulation
 - Function Chief Office
 - Function Closet
 - Function Communications Room
 - Function Conference Room
 - Function Control Room
 - Function Copy/Paper Storage
 - Function Core Battle Simulation
 - Function Corridor
 - Function Digital Battle Staff Trainer
 - Function Director Assistant
 - Function Director Office
 - Function Electric Room
 - Function Elevator
 - Function Elevator Machine Room
 - Function Exercise Director Office

Project Requirements

Mechanical | Security | Fire | Electrical | Landscaping | Zoning | Reporting
Program | Properties | Architecture | Civil | Structural

Civil Requirements

Requirement	Value	UOM	Source
Design Analysis for Civil			
Design Analysis	The goal of the site planning process and design is to provide a functional and economical design, meet the installation's guidelines and enhance the quality of life. Objectives to meet these goals include: a. Improving the quality of life for soldiers b. Grade the project to take advantage of the terrain c. Layout the project to take advantage of energy-efficient design d. Provide storm drainage runoff equal to pre-development levels e. Take into account future adjacent construction utility loads f. Ensure proper relationship with future adjacent construction g. Verify the project meets its basic function with maximum efficiency and economy h. Minimize and or avoid the impact to environmentally sensitive areas if present	Text	
Engineer Data for Civil			
Engineer Name	Rob Callahan Richard Gobin	Text	
Firm/E-Mail	Corps of Engineers - Savannah District C	Text	
Phone/Fax	(912)652-5246 (912)652-5386	Text	
Required Parking			
Accessible Parking	0	Total	from future Wt
Total Parking	0.0	Total	from future Wt
Soil			
Soil Type	Clay	Type	

Design Analysis

The goal of the site planning process and design is to provide a functional and economical design, meet the installation's guidelines and enhance the quality of life. Objectives to meet these goals include: a. Improving the quality of life for soldiers b. Grade the project to take advantage of the terrain c. Layout the project to take advantage of energy-efficient design d. Provide storm drainage runoff equal to pre-development levels e. Take into account future adjacent construction utility loads f. Ensure proper relationship with future adjacent construction g. Verify the project meets its basic function with maximum efficiency and economy h. Minimize and or avoid the impact to environmentally sensitive areas if present

Situation: The current site location is located north of Butner Road, west of Collins Street, south of Deglopper Street, and east of Gorham Street. It includes three WWII buildings and five prefab metal structures. These eight structures require constant maintenance for upkeep. The heating and cooling systems cannot always keep up with

OK Cancel

Layout Composer

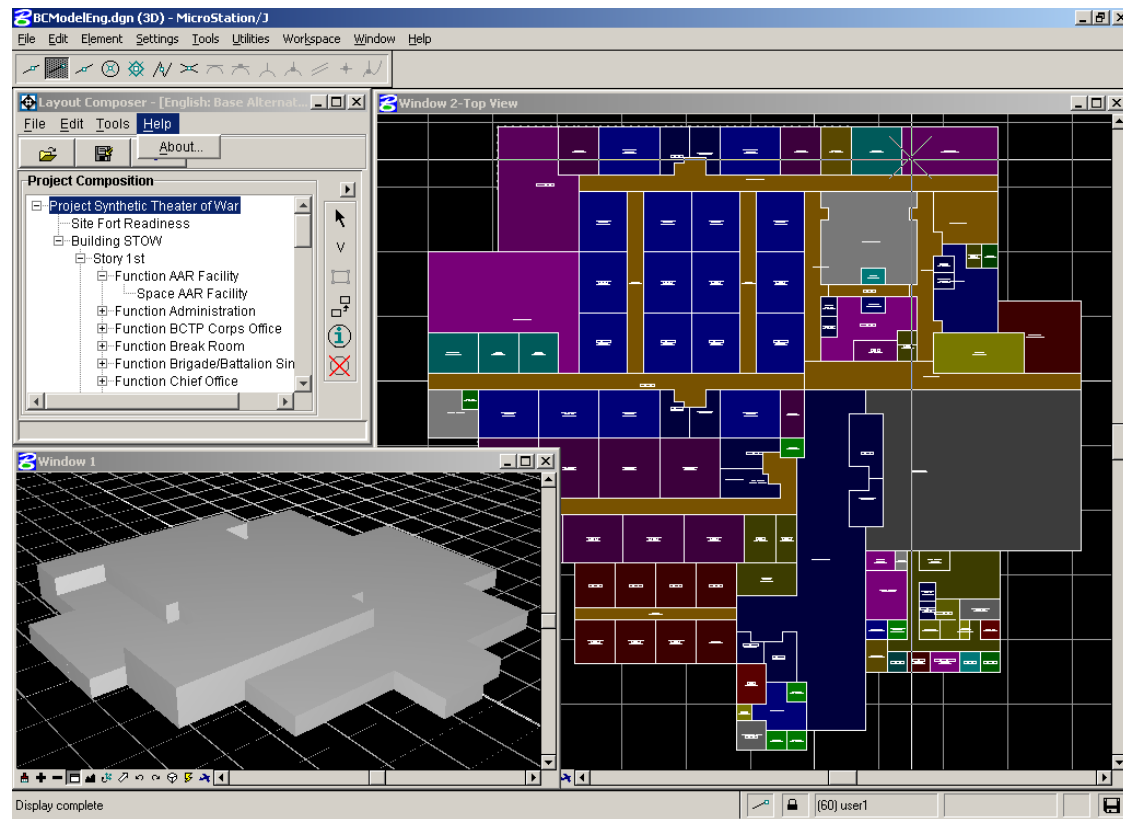
Environmental Quality and Installations

- Generates facility representations in 2D and 3D

- Generates IFC model that meets facility criteria and requirements

- Tracks design solutions against criteria and requirements

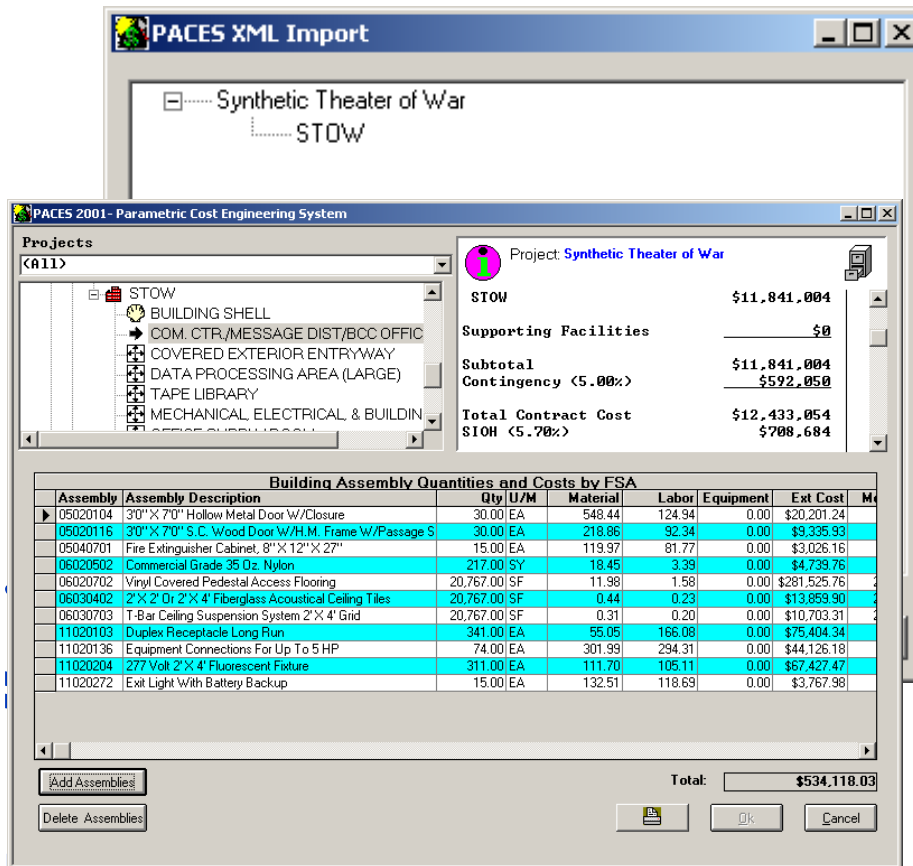
Supports multiple view representations for design analysis (color by function, mass modeling, bubble diagramming)



PACES

Parametric/Programmatic Cost Analysis

Environmental Quality and



PACES, EarthTech, Inc.

- Provide parametric programmatic cost estimate based on user requirements and/or schematic layout

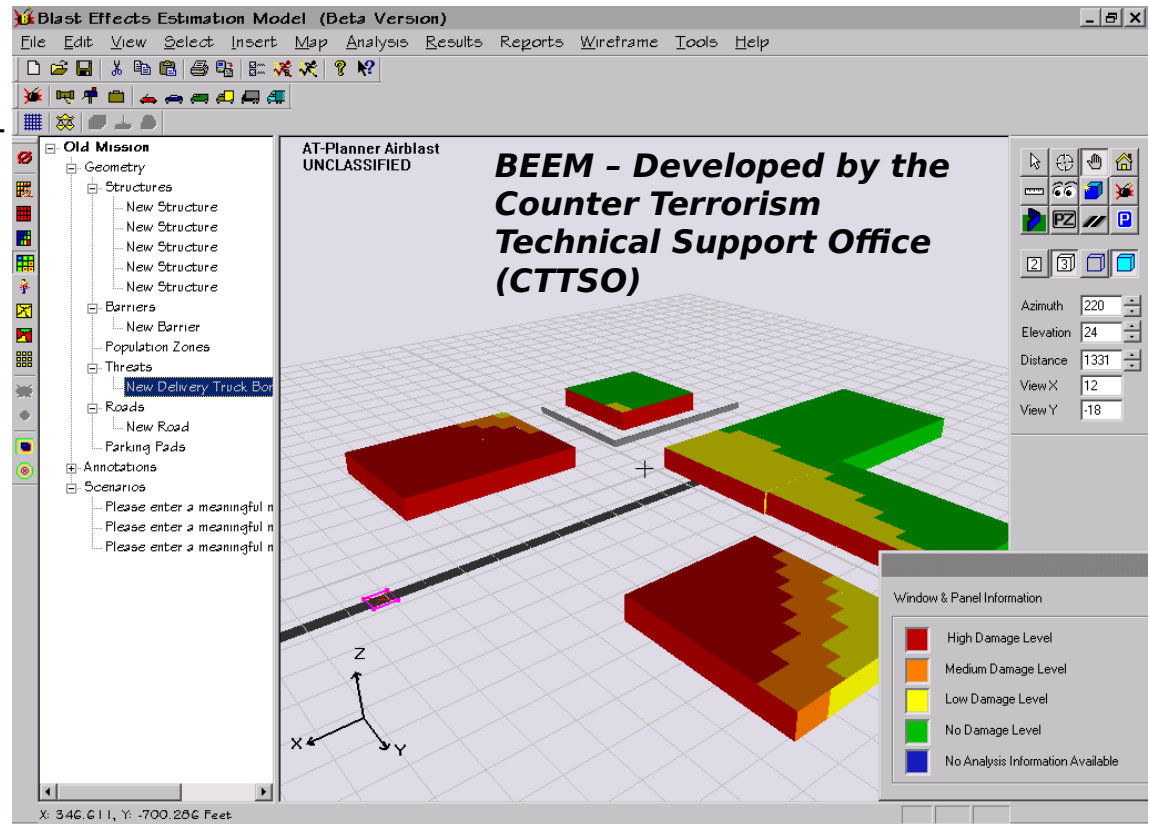
- Rapidly determine cost trade-offs of design choices:

- ✓ Time/Location
- ✓ Higher sustainability rating
- ✓ More secure

Force Protection Analysis

Blast Effects Estimation Model (BEEM)

- Export geometry and building data from Facility Composer to BEEM
- Evaluate performance of building during various threats and countermeasures



Sustainability Analysis

Sustainable Designer's Aid

Environmental Quality and Installations

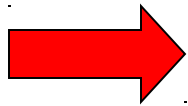
- Link to Sustainable Project Rating Tool(SPiRiT)
- Provide process for using SPiRiT
- Record and track rationale
- Generates SPiRiT rating
- Reuse previous strategies for subsequent projects

www.cecer.army.mil/sustdesign/SPiRiT.cfm

"One ERDC....Providing Technologies for the Transformed Army"

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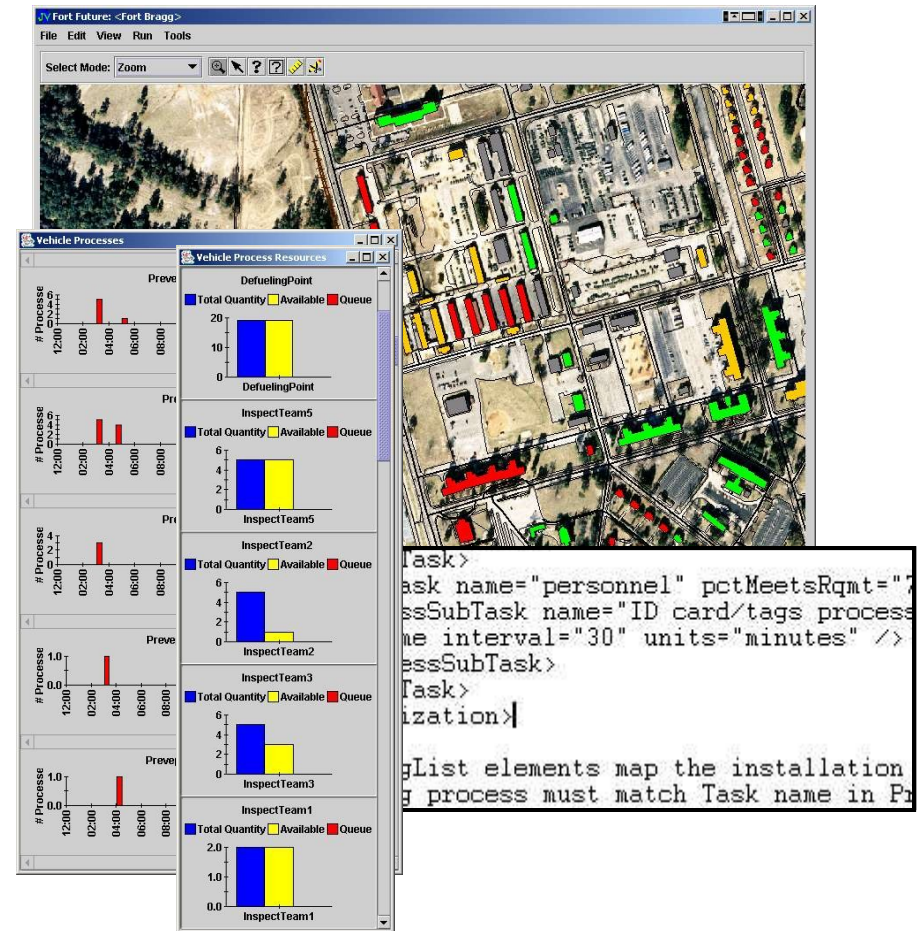
Virtual Installation



Force Projection

Force Projection Simulation

- Charts
 - Resource utilization
 - Process completion
- Text output of simulation - what the agents in the simulation are doing
- Facility status monitor



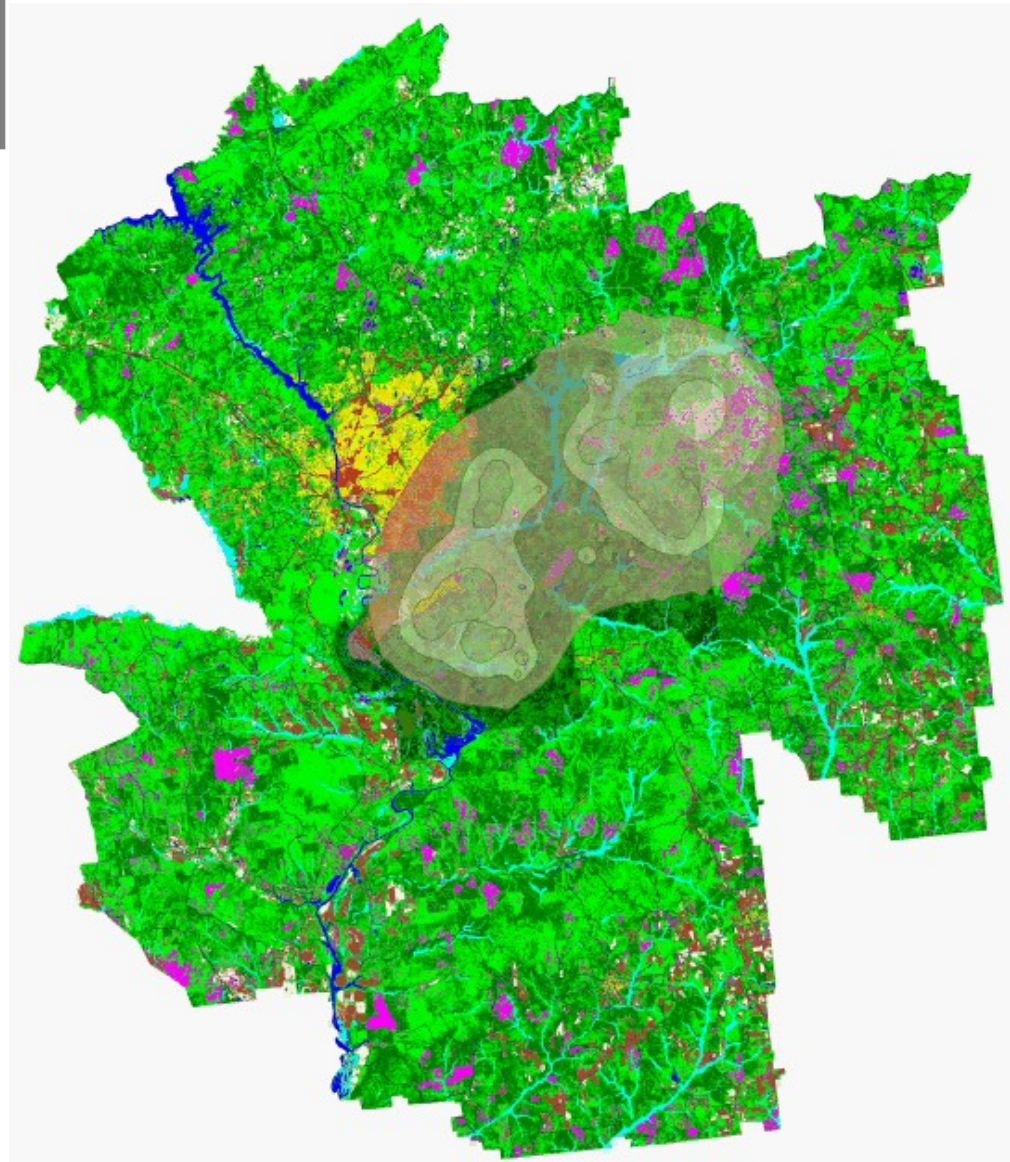
Future Land
Change
Projections

Potential Conflicts: Noise Generation and Urban Growth

Impact on
current/planned
training

- Noise vs
Community Growth

1993-2050



SIRRA

Sustainable Installation Regional Resource Assessment

- Sustainability Indicators
- Auditable Data Sources
- 300 DOD Installations

Fort Future - SIRRA Matrix - Microsoft Internet Explorer

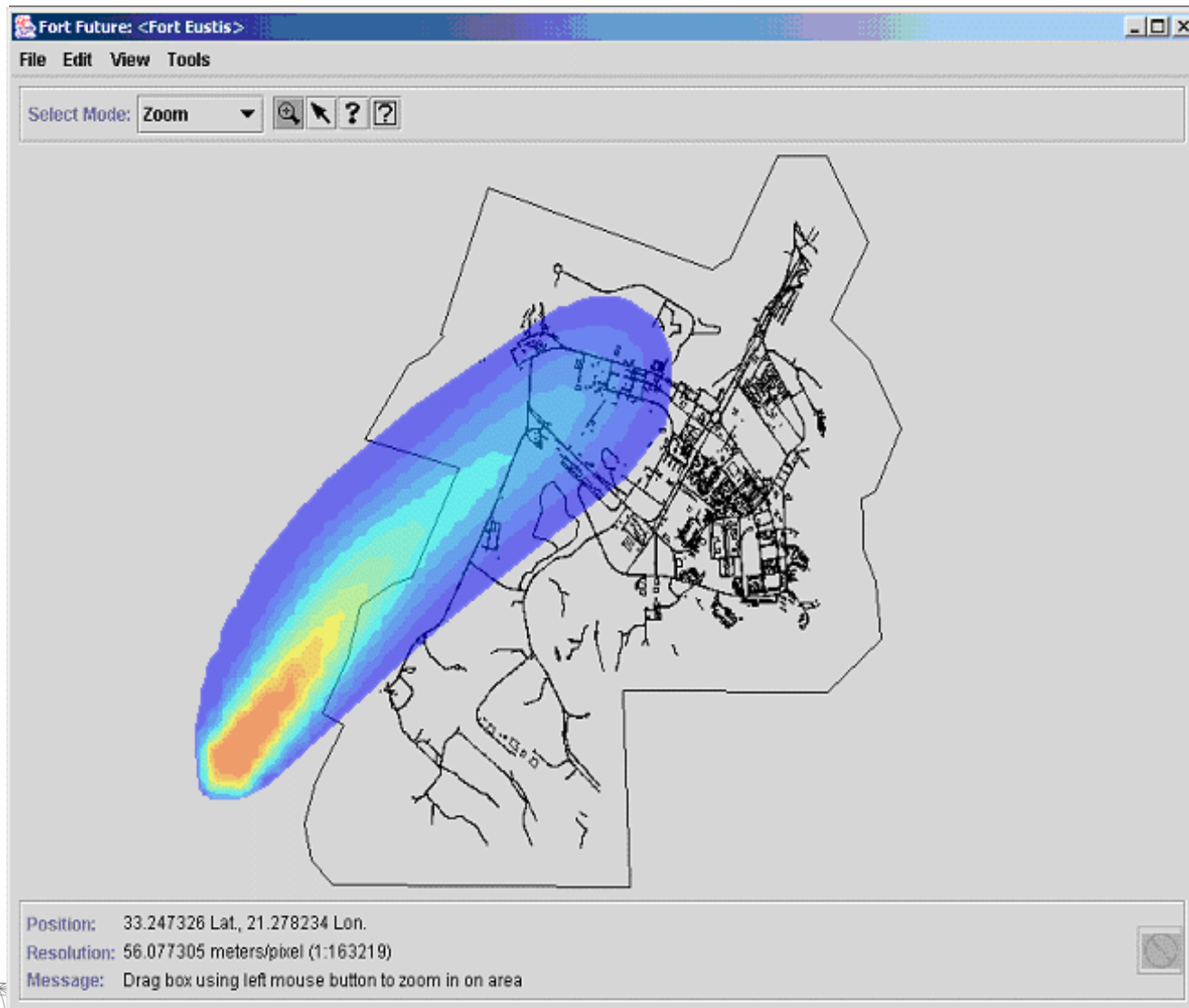
Address: <https://ff.cecer.army.mil/ff/sirramx.do>

Selected service branch: Army (132 installations)

Installation by State		Indicators							
Installation	State	Air Sustainability		Energy Sustainability					
		Criteria Pollutant Non-Attainment (num. violations)	Noise Complaints (num. complaints)	Electrical Source (% non-coal fossil-fueled)	NAG Price Variability (% of US avg. NAG price)	Petroleum Price Variability (% of US avg. petroleum product price)	NAG Imports (% Dependence)	Petroleum Imports (% Dependence)	Electrical Price Structure
Anniston AD (Army)	Alabama	0	0	0.04	-0.18	0.2	-0.59	54.94	No Regulation
Fort McClellan (Army)	Alabama	0	-	0.04	-0.18	0.2	-0.59	54.94	No Regulation
Fort Rucker (Army)	Alabama	0	0	0.04	-0.18	0.2	-0.59	54.94	No Regulation
Phosphate Development Works (Army)	Alabama	0	-	0.04	-0.18	0.2	-0.59	54.94	No Regulation
Redstone Arsenal (Army)	Alabama	0	3	0.04	-0.18	0.2	-0.59	54.94	No Regulation
Fort Greely (Army)	Alaska	0	0	0.75	0.47	-0.13	-0.15	27.46	No Regulation
Fort Jonathan Wainwright	Alaska	0	0	0.75	0.47	-0.13	-0.15	27.46	No Regulation

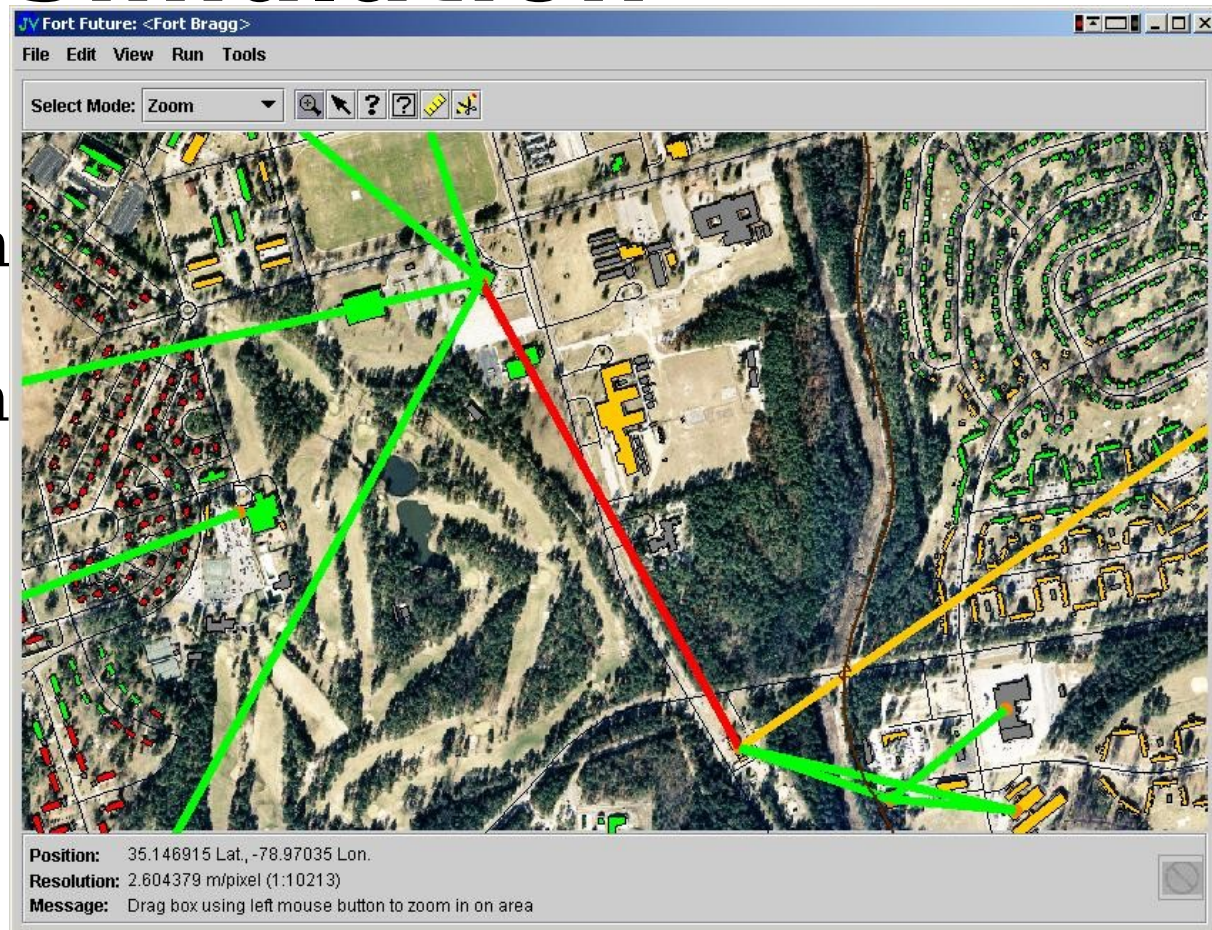
CBRN

Environmental Quality and Installations



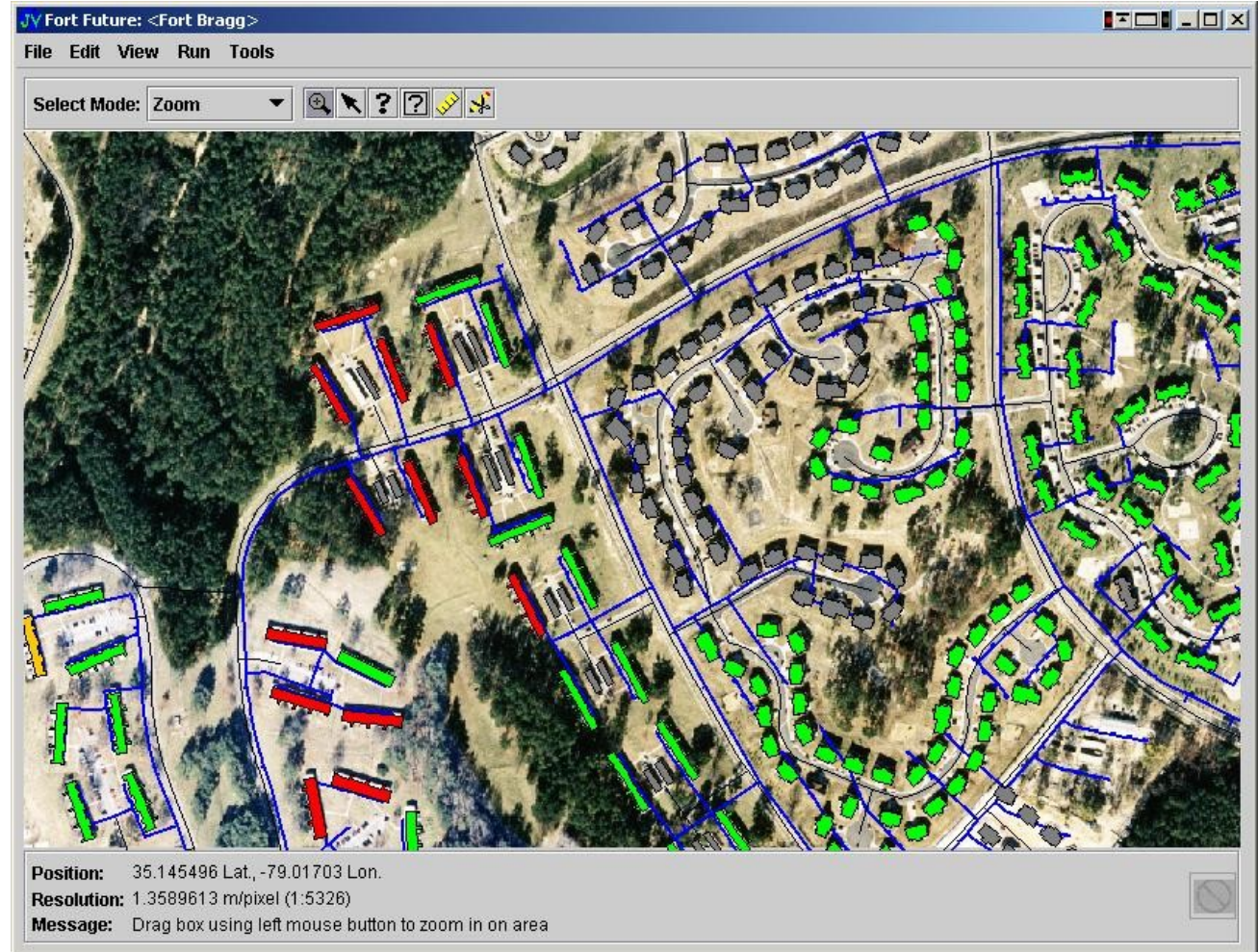
Electrical Power Simulation

- Capacity
- Vulnerability
- Interacts with other simulations in Virtual Environment



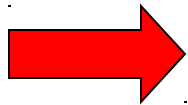
Water System Simulation

- Capacity
- Vulnerable to interruption
- Contamination
- Fuel system to follow in FY05



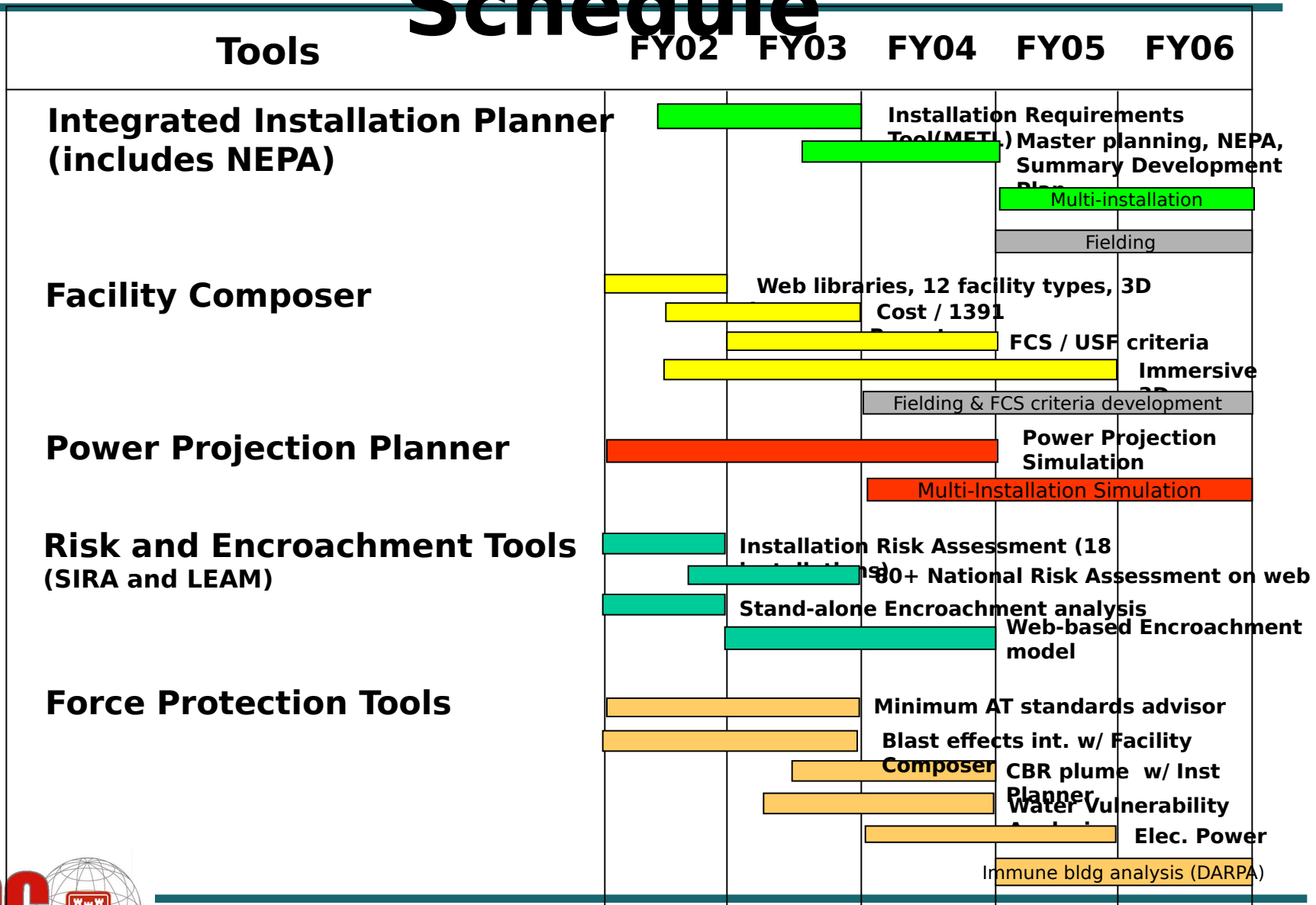
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Fort Future Tools Schedule

Environmental Quality and
Installations



"One ERDC....Providing Technologies for the Transformed Army"

Home Page


[Site Map](#)

Fort Future Home - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://localhost:8080/ff/home.do> Go

Back Forward Stop Reload Home Search Favorites Media Print Mail Links



User: Not Logged in. Log On

Topics

- [Home](#)
- [Resources](#)

Welcome

Fort Future Development Site

Welcome to the Fort Future development server. This site will become operational on October 4, 2004. Until then, users of this site should be aware that applications are made available here only for testing and comment.

If you have questions about the Fort Future Program, please contact the Fort Future Special Project Officer, Dr. Michael Case, at (217) 373-7259 or by electronic mail at michael.case@erdc.usace.army.mil.

About Fort Future

Simulation and Modeling for Installation Transformation

Fort Future is a research program designed to produce capabilities critical to the Army's ability to transform its installations in the tight timeframe required to support our emerging forces. Much as field commanders gain a superior advantage by visualizing the battle space, installation planners will be able to make strategic decisions by visualizing results of many different scenarios.

Fort Future research and development is being conducted by the U.S. Army Engineer Research and Development Center (ERDC) in support of the Assistant Chief of Staff for Installation Management (OACSIM). Fort Future will create a system-of-systems that unites existing and new computer models to form a virtual installation. Building on currently available and planned Standard Army Management Information Systems (STAMIS) that provide a snapshot of the present, Fort Future will use modeling and simulation to help decision-makers explore potential consequences of their decisions.


Technical Notes

Read more about Fort Future

- [Integrated Installation Planning: Technology for Sustainable Installations](#)
- [mLEAM: The Military Land use Evolution And impact Model](#)
- [Building a Computable Facility Model](#)
- [Dynamic Modeling and Simulation Tools for Utility Systems](#)
- [Modeling and Simulation for Force Protection](#)

For problems or suggestions, please contact the [webmaster](mailto:webmaster@bc.eecr.army.mil) (webmaster@bc.eecr.army.mil). Problems with apps? See the [support](#) page. Visit the [downloads](#) page for Fort Future software & tutorials.

[[Privacy Policy](#)] [[Why Register?](#)] [[Register](#)]



Engineer Research and Development Center
US Army Corps of Engineers®

Local intranet

For More Information

Fort Future Site: <http://ff.cecer.army.mil>

Facility Composer Site: <http://bc.cecer.army.mil>



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